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**FACTORS CAUSING INCIDENTS IN A MEGA CONSTRUCTION PROJECT:
A QUALITATIVE STUDY IN KLANG VALLEY**



By

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**Thesis Submitted to
Othman Yeop Abdullah Graduate School of Business,
Universiti Utara Malaysia,
in Partial Fulfillment of the Requirement for the Master of Sciences (Occupational
Safety and Health Management)**

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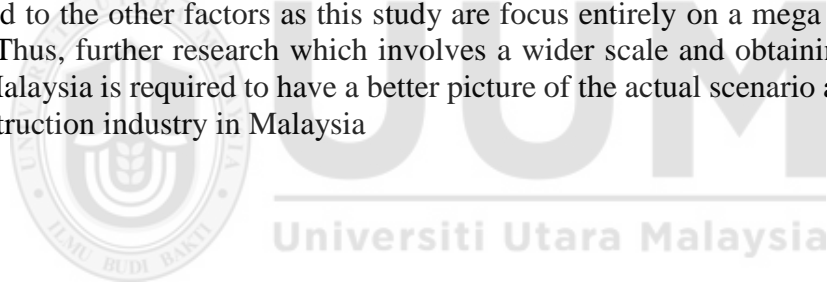
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ABSTRACT

Malaysia being one of the developing country, understands the role of construction as one of the important and productive sector towards economy. Despite the growth, construction industry is categorized as a highly dangerous working environment due to the increasing rates of accident and fatality rates year after year. The aim of this study is to identify root cause of incident in construction industry. This study utilize the qualitative study which focus on approach based on the Ishikawa 5M +1 E method which stresses on several components which are divided into man, management, method, machine, material and environment based on incident report from 2016 to 2018 obtained from a construction of a mega project in Klang Valley. A total of 73 incident reports were obtained and analysis done to identify information such as the activity carried out and time when incident occurs, category depending on extent of injury or damage, type of incident depending on unsafe act or unsafe condition and the root cause of incident to gain better understanding of the research topic. Results shows that the man factor are the most significant factor with method and environment factors also to be significant while the machine and material factors are slightly insignificant based on the data obtained. The study are very depended on the information obtained from the reports and some factors may be more significant compared to the other factors as this study are focus entirely on a mega project in Klang Valley. Thus, further research which involves a wider scale and obtaining data from the whole Malaysia is required to have a better picture of the actual scenario and root cause of the construction industry in Malaysia



ABSTRAK

Malaysia selaku salah sebuah negara membangun faham akan kepentingan industri pembinaan sebagai satu sektor yang penting dan produktif terhadap ekonomi negara. Di sebalik itu, industri pembinaan telah dikategorikan sebagai persekitaran bekerja yang amat berbahaya ekoran daripada peningkatan kadar kemalangan serta maut dari setahun ke setahun. Tujuan kajian ini dijalankan adalah untuk mengenalpasti punca kemalangan dalam industri pembinaan. Kajian ini merupakan kajian kualitative yang berfokuskan pada pendekatan yang berdasarkan pada kaedah 5M + 1E oleh Ishikawa yang menekankan konsep *Man*, *Management*, *Method*, *Machine*, *Material* dan *Environment* berdasarkan pada laporan kejadian dari 2016 sehingga 2018 yang diperolehi dari sebuah tapak pembinaan projek mega di Lembah Klang. Sejumlah 73 laporan kejadian telah diperolehi dan analisis untuk mengenal pasti maklumat seperti aktiviti yang dijalankan serta masa semasa kemalangan, kategori kejadian berpandukan pada tahap kecederaan serta kerosakan, jenis kejadian disebabkan oleh perbuatan atau keadaan tidak selamat dan punca kejadian untuk lebih memahami tajuk kajian. Keputusan kajian menunjukkan bahawa faktor *Man* adalah paling significant diikuti oleh faktor *Method* dan *Environment* yang juga significant manakala faktor *Machine* dan *Material* adalah kurang significant berdasarkan data yang diterima. Kajian ini amat bergantung kepada maklumat yang ditulis dalam laporan kejadian dan sesetengah faktor mungkin lebih significant berbanding faktor lain memandangkan kajian ini hanya bertumpukan sepenuhnya pada satu projek mega di Lembah Klang. Oleh itu, kajian masa depan yang melibatkan skala yang lebih besar serta mendapatkan data daripada seluruh Malaysia adalah diperlukan untuk mendapatkan gambaran yang lebih jelas tentang keadaan serta punca kejadian di industry pembinaan di Malaysia.

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TABLE OF CONTENTS

TITLE	i
CERTIFICATION OF THESIS WORK.....	ii
PERMISSION TO USE.....	iii
ABSTRACT	iv
ABSTRAK	v
ACKNOWLEDGEMENT	vi
LIST OF TABLES	x
LIST OF FIGURES	xi
LIST OF ABBREVIATIONS	xii
CHAPTER 1 INTRODUCTION	1
1.0 INTRODUCTION.....	1
1.1 BACKGROUND OF STUDY	1
1.2 PROBLEM STATEMENT	3
1.3 SIGNIFICANCE OF THE STUDY	7
1.6 SCOPE OF THE STUDY	11
1.7 KEY TERMS	11
1.7.1 Construction	11
1.7.2 Incident.....	11
1.7.3 Root Cause	11
CHAPTER 2 LITERATURE REVIEW.....	12
2.0 INTRODUCTION.....	12
2.1 ACTIVITIES DURING A CONSTRUCTION PROJECT.....	12
2.2 DEFINITION OF ACCIDENT/INCIDENT	15
2.3 ACCIDENT/INCIDENT RELATED THEORIES AND MODELS	16
2.3.1 Domino Theory	17
2.3.2 Human Factor Theory	20
2.3.3 Incident Theory	22
2.3.4 Multiple Causation Theory.....	24
2.3.5 Swiss Cheese Model.....	25
2.3.6 Ishikawa Cause and Effect Model.....	26

2.4	OSH LEGISLATION IN MALAYSIA	28
2.5	ACCIDENT UNDER-REPORTING	31
2.6	PAST STUDIES ON FACTORS LEADING TO WORKPLACE INCIDENTS	32
2.6.1	Man.....	32
2.6.2	Management	34
2.6.3	Method	36
2.6.4	Machine	38
2.6.5	Material	38
2.6.6	Environment	39
CHAPTER 3 METHODOLOGY		40
3.0	INTRODUCTION.....	40
3.1	RESEARCH APPROACH.....	40
3.2	SELECTED QUALITATIVE APPROACH.....	42
3.3	DATA COLLECTION METHODS	43
3.4	DATA SELECTION (INCIDENT REPORT CASES).....	44
3.5	DATA COLLECTION PROCEDURE	44
3.6	DATA ANALYSIS	45
3.7	ETHICAL CONSIDERATIONS	46
3.8	CONCLUSION	48
CHAPTER 4 RESULTS AND DISCUSSION.....		49
4.0	INTRODUCTION.....	49
4.1	SUMMARY OF DATA OBTAINED.....	49
4.2	TYPES OF ACTIVITY DURING INCIDENTS	50
4.3	TIME INCIDENT OCCURS	54
4.4	TYPES AND CLASSIFICATION OF INCIDENT.....	56
4.5	CAUSE OF INCIDENT- UNSAFE ACT AND UNSAFE CONDITION....	62
4.6	ROOT CAUSE OF INCIDENT	65
4.6.1	Man.....	65
4.6.2	Management	70
4.6.3	Method	74

4.6.4	Machine and Material.....	78
4.6.5	Environment	81
CHAPTER 5 CONCLUSION.....		84
5.0	INTRODUCTION.....	84
5.1	SUMMARY OF THE FINDINGS.....	84
5.2	RECOMMENDATION TO IMPROVE SAFETY AT WORKPLACE	85
5.2.1	Government.....	85
5.2.2	Client and designer factors.....	86
5.2.3	Education and awareness	88
5.3	FUTURE RESEARCH.....	89
5.4	CONCLUSION OF STUDY	90
Reference		91
Appendix A - Summary of Incident Reports.....		101



LIST OF TABLES

Table		Page
2.1	Common job activities and trade during a construction of a housing project in the Netherlands.	13
2.2	Summary of theories	27
3.1	Features of Qualitative & Quantitative Research	41
3.2	Root causes of factors leading to construction incident	47
4.1	Summary of type, definition and number of incident	59
4.2	Types of unsafe act and unsafe condition	64



LIST OF FIGURES

Figure		Page
1.0	Occupational Accidents Statistics by Sector Until Jun 2018	5
2.1	Domino Theory	18
2.2	Domino Theory in which removing a single factor can prevent accident	20
2.3	Human Factor Theory	22
2.4	Accident/Incident Theory Model	23
2.5	The multiple causation theory model	24
2.6	Reason's Swiss Cheese Model	26
2.7	Ishikawa cause and effect model	27
4.1	Types of activity during incident	51
4.2	Time Incident Occurs	55
4.3	Type of Incident	57
4.4	Cause of Incident	63
4.5	Root Cause of Incident due to People (Man) Factor	66
4.6	Root Cause of Incident due to People (Management) Factor	71
4.7	Root Cause of Incident due to Method Factor	75
4.8	Root Cause of Incident due to Machine Factor	79
4.9	Root Cause of Incident due to Material Factor	80
4.10	Root Cause of Incident due to Environment Factor	82

LIST OF ABBREVIATIONS

DOSH	Department of Occupational Safety and Health
FMA 1967	Factory and Machinery Act 1967
LRT	Light Rail Transit
MRT	Mass Rail Transit
NADOPOD	Notification of Accident, Dangerous Occurrence, Occupational Poisoning and Occupational Disease Regulations 2004
NIOSH	National Institute of Occupational Safety and Health
OSH	Occupational Safety and Health
OSHA 1994	Occupational Safety and Health Act 1994
SOCISO	Social Security Organization



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CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

This chapter comprises of the background of the study, problem statement, scope of study, research questions, objectives of the study and significance of the study.

1.1 BACKGROUND OF STUDY

The developing as well as the developed nations have realized and understand the significance of construction industry in socio-economic and sustainable development of a country. Dong, Entzel, Men, Chowdhury, and Schneider (2004) states that in the developed nations such as United States, construction labor is considered one of the most dangerous occupations and one of the high risk industry related to Occupational Safety and Health (OSH). It is a common practice that all workers are given basic safety induction prior to them working at the site in order to educate them to work safely (Health and Safety Executive UK, 2009) but despite that, the construction industry is also categorized as a highly dangerous working environment due to the continuous increasing rates of accident and fatality rates as reported year after year. According to the United States National Census of Fatal Occupational Injuries in 2011 (Bureau of Labor Statistics, 2012), a large number of people are killed because of construction accidents each year and in the year 2010 and 2011, there were 774 cases and 721 cases respectively of fatal occupational injuries among construction workers, a rate of almost two death per day. Statistics from the

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Appendix A

Summary of Incident Reports

No.	Incident Date	Incident Time	Brief Description
1	18-10-2016	06.00 AM	One (1) security had been hit by an I-beam when he is in the process to remove the public barricade.
2	1-11-2016	08.50 AM	A motorcyclist fell down while trying to avoid sunken piloting trench. Another accident happens when two cars behind the motorcycle collide when trying to avoid hitting the motorcyclist.
3	16-11-2016	14.30 PM	A concrete mixer truck was delivering concrete to CH 0. When it reached at Jalan Utama, the mixer truck accidentally hit one of Telecom pole and the cable loose from its hook.
4	16-11-2016	20.00 PM	Notified by Site Safety Supervisor, 9 nos of concrete barrier fell into sewerage pipe work area. CCTV evidence shown trailer had hit the concrete barrier from the alignment and concrete barrier fallen into the existing sewerage pipe approximately 3 hours after the misalignment of concrete barrier.
5	16-11-2016	17.30 PM	A low loader was delivering concrete pipe culvert at chainage 1900. After unloading the culvert pipe, the low loader was on the way out when it accidentally slip and its front tyre fell into monsoon drain.
6	19-11-2016	11.00 AM	A 55 tonnes mobile crane with registration no. BGN28XX and PMA no. SL-PMA407XX was heading to chainage 1900. When it reached at chainage 1700 the crane got stuck at soft ground of haul road. The crane managed to get out from the area with the rescue of excavator around 1230 hrs.
7	5-12-2016	17.20 PM	Lorry (from supplier TKH, No. plat: W76XXY) arrived at approximately 1520hrs delivering clay brick (2 pallet), OPC 20 bag and wire mesh. The lorry drove into the piloting area and the front tyre stuck into the soft ground.
8	10-12-2016	11.30 AM	Approximately at 1130hrs on 10th Dec 2016, during drilling of micropile point 114d at SGB 31, the silt fences and railing gave way and soil fell into the monsoon drain. No injuries recorded.

9	19-1-2017	16.25 PM	Just after 1600hrs heavy rain commenced and stopped at 1625hrs. The heavy deluge of rain water caused the sites temporary sedimentation ponds to overflow at the risers. This discharge resulted in ILPP carpark and the building aprons to be flooded with silty water. The heavy rainfall also caused the ILPP pond to overflow its banks and caused Jalan Jelutong to flood. Flooding was also noted at the housing area at vicinity of Jalan Institute.
10	22-2-2017	14.30 PM	At 1350hrs, received report from Traffic Marshal regarding a sink-hole on the road surface at SDW 24 North Bound road towards Sungai Buloh. Upon further excavation, it was found that the sinking holes is due to the existing concrete slab was hacked and found a plywood placed to protect the hacked drain box culvert by Sub-contractor to allow the celcom cable ducting laid underneath
11	25-2-2017	18.00 PM	At approximately 1730hrs, heavy rains ensued and stopped at 1900hrs. The heavy rain and the discharge from temporary sedimentation pond at SB3 caused waters to overflow at the IPS paddy fields, resulting in flooding at the new DOA quarters with silty waters. The rain commenced again during the night further contributing to this discharge.
12	17-3-2017	01.30 AM	At around 0110hrs on the 17th of March 2017, hoarding installation was in progress. However, at around 0130hrs, a car was identified driving from Kepong had run over the traffic cones that were used for the road taper and hit into the back of the lorry that was park within the work zone to unload metal hoarding. The lorry driver was brought to Hospital Sg. Buloh for medical check. The lorry driver also sustained minor dislocated leg and treated outpatient.
13	30-3-2017	08.40 AM	A tipper lorry laden with crusher run coming from Jalan BS 3/1 illegally crossed Jalan Putra Permai into the site entrance. In the process of doing so the lorry caused a collision between 2 cars and a traffic light. The 2 cars (a Proton Wira and a Perodua Kenari) were driven by members of the public and coming uphill
14	18-4-2017	02.15 AM	Existing retaining wall suddenly collapse causing injury to a worker's leg

15	18-4-2017	13.30 PM	Complain from nearby company railway company found that there's 2 location of the track suspect to have experience settlement & movement which is at The suspected root cause of the movement & settlement are due to the rock blasting activity.
16	18-4-2017	14.15 PM	1 backhoe and 2 workers commence site clearing work and dismantling of guardrail at traffic light junction at approximately Chainage 25 cause damage to fiber optic cable underground.
17	21-4-2017	03.30 AM	The 50 ton crawler crane was tasked to unload and adjust the position of PDA frame from the trailer. While unloading and swinging the PDA frame from trailer, the operator felt a slight tilt of the crawler crane. The crane operator suddenly decided to lower down the PDA frame causing damage to 8 nos. of plastic barrier
18	2-5-2017	15.50 PM	Plastic barriers and plastic hoarding which were not secured properly toppled over into public parking area, due to extreme wind and heavy rain.
19	4-5-2017	03.30 AM	Underground fiber optic cable at depth 0.1m damaged during premix excavation
20	4-5-2017	16.30 PM	Heavy rain started causes flooding at three locations, MP07, KBN08 and KB14. Existing control measures and sediment basin not adequate. No injury and property damages were noted due to this accident.
21	10-5-2017	11.40 AM	A motor grader (rental) suffered engine failure at downhill section of access road adjacent SB1. As a result of engine failure and downhill gradient caused the motor grader to slide out of control onto berm of temporary SB1 and narrowly missed hitting the coming vehicle.
22	13-5-2017	11.00 AM	A trainee was doing housekeeping in front of TXX's site office. Whilst he attempted to open a steel cabinet door, the handle broke and he injured his hand. He was send to Hospital Serdang and got the wound stitched as outpatient treatment.

23	15-5-2017	16.45 PM	A low loader was in the process of relocating reinforcement bar and while the low loader was travelling up a slight incline at Chainage 1500, the load of rebar partially slid off back of low loader onto the internal site road. The load slid off because timber logs were used to support the bars on the low loader and the load was also not secured to the low loader.
24	02-06-17	11.40 AM	Excavator traversing site almost hit an overhead cable
25	17-06-17	23.00PM	A 55 ton mobile crane was setting up for lifting of valve (wt: 4.5 tonne). SHE team found out that the mobile crane outrigger setting out was not as per manufacturer recommendations and no lift plan for the 4.5 ton valve.
26	25-07-17	16:00PM	The delivery and offloading of the site office under the existing TNB pylon cables, without TNB approval and works conducted in restricted zone. Received official warning from TNB.
27	02-08-17	11:30AM	While boring rig machine (BG38) started drilling at point SDW33-1, found out that clean water gushing out from the ground. It was found that the machine scratched an underground 600mm SYABAS water pipe at approximately 500mm depth.
28	07-08-17	18:15PM	The loader carrying a cast pile head rolled over on the public highway, no injuries reported.
29	09-08-17	16:08PM	Mobile crane was stuck during arrangement for parking to start work, no damage to the machinery and properties, weather fine, no involvement from and to public.
30	14-08-17	11:30AM	An inspector of work (SC), fell from his bike while travelling inside work area at west portal due to slippery access. He was refer to a back specialist saw and declared fit to work.
31	21-08-17	10:00AM	While site clearing activity was in progress at location DPS09. The excavator operator has pushed down a tree and the branches of the tree fell off on the road plastic barriers nearby.

32	23-08-17	09:30AM	A skylift required to exit the site onto the highway from P47. The flagman stopped the public traffic but a motorcyclist still travelling along the road unable to stop and lost control and hit into another motorcycle park at the site entrance.
33	25-08-17	16:00PM	It was observed a mobile crane was set-up to lift a rebar pile. Lifting plan present at site contained false and inaccurate data that reflected a lift that was outside the allowed lifting capacity approved by the manufacturer of the crane.
34	08-09-17	08:45AM	Mr. CXXXX a sub-con dump truck driver was found unconscious over the wheel of his dump truck, first aid was administered but to no avail, Mr CXXXX died at the wheel of his dump truck.
35	28-9-2017	12:00PM	TMDT truck driver (MXX) was transporting GI wire for Traffic maintenance works and while turning the truck driver estimated wrongly, hit the middle of GI boom gate and cause it to bend out of shape.
36	29-9-2017	14:30PM	During mechanical excavation works the excavator bucket severed underground armoured cable 25mm ² .
37	30-9-2017	16:30PM	During piling operations carried out by DXXXXXX Venue Team the kelly bar lifting steel wire suddenly snapped causing the load to fall.
38	7-10-2017	15:50PM	4 wheel vehicle bearing registration number (VAE 61XX) moving towards downhill (Station Hill), skidded uncontrolled and stopped horizontally.
39	9-10-2017	13:35PM	Southbound Water Bowser truck (ETA 33XX) collided in a partial head-on with a Northbound Empty Dumptruck. The driver had his leg trapped and injured. He was sent to Serdang Hospital
40	14-10-2017	00:50AM	Last night the rebar jig on Pier CCC 13 was dismantled and removed. This morning prior to works starting it was witnessed that the vertical rebar was leaning over 90 degrees implying a collapse has occurred.
41	19-10-2017	12:30PM	During concreting of pier head on pier CCCS 27, the crane (SL PMA 327XX) being used to hoist up the concrete suddenly stopped moving causing the bucket to hang mid-air

42	19-10-2017	19:19PM	During piling operations driving in a steel casing using a vibro hammer at point TNES 15-2 the steel casing being driven broke at the welding joint.
43	20-10-2017	17:00PM	A tipper delivering 20T of sand toppled over sideways when unloading
44	23-10-2017	09:45AM	During mechanical excavation works as part of the piloting works scope using a backhoe a 11KV 240mm sq xlpe cable was struck and caused the power system to trip.
45	23-10-2017	13:00PM	A roller compactor toppled over off the haul road near access 2. The operator is conscious and talking and send to clinic to receive outpatient treatment
46	31-10-2017	14:45PM	During torch burning activities at base plate level (1.5m below ground level) the torch flame was intermittent due the flow of the gas. The burner requested someone from the ground level (where the oxy and acetylene cylinder are located) to shut off the cylinder valve. A TXX excavator operator who happened to be nearby helped to shut the valve. The burner cleaned the nozzle. The burner instructed to open the valve. Once the gas re-flow, suddenly after the flashback arrestor the hose ruptured and ignited catching the TXX operator on the face and front of the body. Suspected minor trauma and was given first aid on site and sent to clinic for further medical attention by TXX site supervisor. The acetylene hose at 1cm away from flashback arrestor was found to be damaged.
47	4-11-2017	09:30AM	CXXXXX whilst clearing a concrete footing using a tracked excavator during demolition works pulled out and damaged 2 (two) number of 11kV cables which were cast into the footing.
48	18-11-2017	11:00AM	Three pieces of stacked Kentledge Blocks which was just unloaded and stacked on top of each other, toppled over and fell down.
49	22-11-2017	15:15PM	Around 1600 heavy downpour occurred in Jalan Utama. The area is interfacing between XXX5 and XXX6. The bund constructed in XXX5 site cannot cater of high run off rainfall volume and burst, the water overflowed onto Jalan Utama causing flash flood



50	5-12-2017	16:30PM	Mr. Yan TXXX WXX was carrying out his Post Concreting Inspection inside the Pilecap area at TNE 26, slipped and fell and injured his wrist.
51	10-12-2017	08:30AM	A Battery for genset and 2nos of aircon outdoor unit were found stolen.
52	16-12-2017	15:40PM	A 10 wheeled lorry transporting sand to site toppled at CH200. The incident happened when the lorry was tipping to unload the sand. The driver suffered minor lacerations on his upper back.
53	27-12-2017	12:00PM	En Mohd Sharul NXXXXXX employed by the SC for M&E lost control of his motor cycle reg no: VB 55XX, model type: Honda Wave Alfa, colour: red after passing through the wheel wash and skidded near the entrance of Cyberjaya site area. He failed to notice a sand bundle in front of the wheel wash.
54	2-1-2018	16:15PM	Soil Investigation work was carried out. During mechanical excavation works to a depth of 4.5m, It was witnessed water was flowing from the excavation and underground piping was found damaged
55	13-1-2018	17:30PM	During SI drilling works at TPSS20-CBH5 around 5pm. At a drilling depth of 1.5m, the PIC noticed water rushing out from the S.I borehole. Suspected underground pipe burst.
56	15-1-2018	08:10AM	On inspecting falsework scaffolding, it was identified a number of scaffold components were damaged, on investigating it was concluded the components must have been struck by moving site vehicles
57	15-1-2018	18:15PM	Worker Mohammad RXXXXXX injured his hand when it got caught in between concrete bucket and starter bar. X-ray showed that the Injured person finger does not have any cracks or breaks and only external injury confirmed in x-ray by hospital Serdang.
58	30-1-2018	12:30PM	The butterfly valve of a skid tank at near CXXX North station was broken, causing spillage of diesel. To contain the diesel spill, it was transferred into a 200L drum. However, due to improper method of fuel transfer, the excess diesel spilled on to the ground.
59	3-2-2018	13:35PM	A worker's left hand got caught between an extension pile and a starter pile while carrying out a driving RC pile activity. The worker was sent to Serdang hospital and require operation thus considered temporary disability of left hand.

60	7-2-2018	10:55AM	A worker, Name : Arif Miah, no passport: bl0686XXX. Whilst dismantling mould formwork pier was knocked off the work platform approx 3m high and fell to ground. Medical treatment and discharge from hospital the following day
61	20-2-2018	08:30AM	The Sub-Contractor supervisor found out the company tools and materials were stolen during his first day work once come back from long break for CNY festival.
62	23-2-2018	02:30AM	Existing old water pipe 25mm dislodge during activity to install 250mm water pipe.
63	2-3-2018	15:40PM	During roughening up works on Column, 3rd Lift, a worker fell approx 0.5m onto the column shuttering in front of him. On visual inspection the IP had minor injuries to the back of the head and facial injuries. Received few days medical leave
64	4-3-2018	23.40pm	A launching gantry / beam launcher collapsed at a construction site in Jalan JXXXXXXX killing one of the workers and causing permanent disability to another
65	5-3-2018	12:00PM	Passenger hoist's operation team has found that a crack on the tie back at level 11 that may endangers the operation of the passenger hoist. HSE team was notified and instructed them to lower down both passenger hoist cages to ground floor.
66	12-3-2018	10:30AM	During HSE Audit it was Observed 3 workers was beside the excavator whilst the machinery was swinging. (Very likelihood of person(s) being struck by moving machinery). Exclusion zone not in place, Banksman not available.
67	13-3-2018	20:00PM	During segment launching, slight deformation of secondary beams was noticed. worker finger got caught , SBG launching has been stopped until design issue has been sorted. Minor cut on worker finger.
68	15-3-2018	15:00PM	A backhoe carrying out V ditching, slipped down the embankment.
69	17-3-2018	11:55AM	A Worker assisting in grounding a load caught his right thumb between the load being landed and the timber packing it was being landed upon. Send for treatment at clinic and refer to hospital requiring surgery

70	24-3-2018	23:18PM	TM 1x144c fiber optic cable damage due to slope trimming using an excavator.
71	26-3-2018	20:50PM	At 8.50pm today, rough terrain crane 45 tonne has complete the works and go to park the crane at designated parking area at DD40, however the brake has malfunction and cause half of the crane body fell down in the monsoon drain.
72	4-4-2018	09:59AM	At SDW11 the fluid stabilisation (polymer) pipe burst and caused the slurry over flow to Jalan Kuala Selangor (Kepong Bound).
73	23-4-2018	13:13PM	Slope erosion is observed near the Taman NXXX EXXX silt trap area. Initial investigation shows water continuously leaking from the water tank belongs to nearby Institut SXXXXX Malaysia which is located on top of the slope. The water flows to the silt trap area which is at lower ground through the damaged drains and caused the slope erosion.

Note: Brief Description was amended by replacing words with the alphabet X on items such as People Name, Vehicle Number Plate, Places, Street Name to ensure confidentiality of the project in which the data is obtained.

